

REMARKS

This Amendment is filed in response to the Office Action mailed May 2, 2007.
All objections and rejections are respectfully traversed.

Claims 1-32 are in the case.

Claims 24-32 have been added to better claim the invention.

Claims 15 and 16 have been amended to better claim the invention.

Request for Interview

The Applicant respectfully requests a telephonic interview with the Examiner after the Examiner has had an opportunity to consider this Amendment, but before the issuance of the next Office Action. The Applicant's undersigned attorney may be reached at 617-951-2500.

Information Disclosure Statement

The Applicant respectfully points out that the Examiner did not initial U.S. Patent No. 6,760,304, which is presented as item 5 on sheet 1 of the Information Disclosure Statement filed on July 18, 2003, by Applicant. Enclosed is a new Information Disclosure Statement by Applicant including the non-initialed disclosure. Applicant respectfully requests that the Examiner consider the reference.

Claim Objections

At paragraph 2 of the Office Action, the Examiner objected to claim 14 on the grounds that it contains a spelling error. The Examiner suggested that "Fibre Channel ID" should be amended and re-written as "Fiber Channel ID." Applicant respectfully notes that "Fibre Channel" is a standard defined by ANSI's Technical Advisory Group for

ISO/IEC Joint Technical Committee (JTC) 1, and is defined in Technical Committee T11: I/O Interface Fibre Channel Standards X.3230-1994-Fibre Channel Physical and Signaling Standard (FC-PH) initial core standard. As the ANSI standard document, X.3230-1994 (FC-PH) uses the term “Fibre Channel,” Applicant’s claimed invention uses the standardized spelling of the term “Fibre Channel.” As such, Applicant believes that no correction is necessary to the term “Fibre Channel.”

At paragraph 3 of the Office Action, the Examiner objected to claim 16 as having the wrong dependency. Applicant thanks the Examiner for pointing out the typographical error in claim 16, which has been corrected by way of this Amendment.

Rejections Under 35 U.S.C. § 102(e)

At paragraph 5 of the Office Action, the Examiner rejected claims 15 and 16 under 35 U.S.C. § 102(e) as being anticipated by Craddock et al., U.S. Publication No. 2003/0061296 (hereinafter “Craddock”).

Applicant’s claimed novel invention, as set forth in representative claim 15, comprises in part:

15. A method for initiating a peer-to-peer communication session, the method comprising the steps of:

(a) *attempting a first remote direct memory access read operation directed to a predefined hardware address and a predefined port number*; and

(b) performing, in response to a successful step (a), a first remote direct memory access write operation directed to the predefined hardware address and the predefined port number.

Craddock teaches “a method for processing a memory semantic I/O read to storage operation” [Paragraph 0122, lines 6-7]. The method in Craddock comprises “an upper-layer I/O read protocol between a host 1400 and storage device adapter 1402, connected by a SAN subnet 1403” [Paragraph 0134, lines 1-3]. Specifically, a process

running on a host invokes a device driver associated with the storage device adapter, specifying that data from a storage device is to be read into host memory [Paragraph 0135, lines 1-5]. To establish a connection, the storage adapter then “uses a connection management protocol REP reply message’s private data field to pass back to the device driver the memory attributes of the adapter’s Storage Request and Storage (Write) Data areas” [Paragraph 0118, lines 2-5]. The memory attributes consist of the initial memory address(es), length(s), and R_keys(s) of the Storage Request area (i.e., the area that is used to contain Storage Request Control Blocks from the host) and Storage Data area (i.e., the area that is used to contain the Storage Data which will be transferred from the host to the storage adapter and ultimately to the storage device) [Paragraph 0118 lines 6-11]. The device driver then creates a storage request in the memory of the host, the request comprising a transaction ID (i.e., used to correlate response message, once created, with the storage request), a list of data segments (i.e., starting virtual address, R_Key, and length), a disk address (e.g., SCSI address, SCSI logical unit number), and a linear block address (i.e., the location where the data resides on the storage device) [Paragraph 0137, lines 1-9]. The host then transmits the storage request to the adapter [Paragraph 0146 lines 1-2]. The adapter processes the request and data is written from the adapter’s storage to the host [Paragraph 0146 lines 2-5]. Finally, the adapter sends a confirmatory response message to the host to notify the host that a successful transaction has occurred [Paragraph 0146 lines 5-7]. In other words, Craddock discloses a method for dynamically establishing a connection between a host and a storage adapter using Connection Management messages to determine addressing information.

Applicant respectfully urges that Craddock does not show Applicant’s claimed novel use of *attempting a first remote direct memory access read operation directed to a predefined hardware address and a predefined port number*.

Applicant claims a system and method for establishing a peer connection using reliable RDMA primitives by establishing the connection using *predefined* addressing information. In particular, Applicant claims a method for initiating a peer-to-peer

communication session by *attempting a first remote direct memory access read operation directed to a predefined hardware address and a predefined port number*. In other words, Applicant claims a method to establish VI/QP communication even in the absence of connection primitives normally provided by the VI/IB implementation by using *predefined* or static addressing information. Craddock teaches a method for *dynamically* establishing a connection between a host (e.g., first peer) and a storage adapter (e.g., second peer) using Connection Management messages (e.g., communication primitives) to *dynamically* determine addressing information. Specifically, Craddock discloses a method for *dynamically* establishing a connection using a connection management protocol REP reply message to pass the memory attributes of the storage adapter's Storage Request and Storage Data areas to a host. Put another way, the storage adapter's memory attributes *dynamically* define the addressing information (e.g., the hardware address and port number) for the connection. In sharp contrast, Applicant's claimed invention utilizes *predefined* addressing information and establishes a peer connection by *attempting a first remote direct memory access read operation directed to a predefined hardware address and a predefined port number*.

Applicant respectfully urges that the published Craddock patent application is legally precluded from anticipating the claimed invention under 35 U.S.C. § 102(e) because of the absence from the Craddock application of Applicant's novel use of *attempting a first remote direct memory access read operation directed to a predefined hardware address and a predefined port number*. Therefore, claims 15 and 16 are believed to be in condition for allowance.

Rejections Under 35 U.S.C. § 103(a)

At paragraph 9 of the Office Action, the Examiner rejected claims 1-3, 13-14, and 17-19 under 35 U.S.C. § 103(a) as being unpatentable over Craddock in view of Plummer et al., U.S. Publication No. 2005/0166185 (hereinafter "Plummer").

Applicant's claimed novel invention, as set forth in representative claim 1, comprises in part:

1. ***A method for initiating a peer-to-peer communication session,*** the method comprising the steps of:
 - attempting a first remote direct memory access (RDMA) read operation directed to a cluster partner;
 - performing, in response to a successful first RDMA read operation, a first RDMA write operation to the cluster partner;***
 - performing, in response to a successful RDMA write operation, a second RDMA read operation directed to the cluster partner; and
 - performing, in response to a successful second RDMA read operation, a second RDMA write operation to the cluster partner.

As noted above, Craddock discloses a method for establishing a connection between a host and a storage adapter using Connection Management messages to communicate I/O consumer information [see Craddock, Fig. 12]. *Once the connection is established*, Craddock teaches a method for performing “an RDMA transfer between the host and adapter to write data from the adapter’s storage to the host adapter’s memory [Paragraph 0146, lines 3-5]. Craddock does not teach ***a method for initiating a peer-to-peer communication session by performing, in response to a successful first RDMA read operation, a first RDMA write operation to the cluster partner.***

Plummer teaches a method for replacing recursive C loops with JAVA programming language recursion [Paragraph 0013]. There is no motivation to combine Craddock and Plummer. Plummer teaches a method wherein one programming language is re-written with another programming language to prevent recursion in loops coded into software. Craddock, however, discloses a non-analogous invention relating to communication between a host computer and an I/O device. Therefore, Applicant respectfully urges that there is no motivation to combine Craddock and Plummer.

Even if there was such a motivation, Applicant respectfully urges that Craddock and Plummer either taken singly or in any combination are legally insufficient to render the presently claimed invention obvious under 35 U.S.C. § 103(a) because of the absence in each of the cited patents of Applicant's claimed ***performing, in response to a successful first RDMA read operation, a first RDMA write operation to the cluster***

partner. Therefore, claims 1-3 are believed to be in condition for allowance.

Further, Applicant's claimed novel invention, as set forth in representative claim 13, comprises in part:

13. A method for initiating a peer-to-peer communication session, the method comprising the steps of:
performing a first remote direct memory access read operation directed to a cluster partner; and
performing, in response to a successful first remote direct memory access read operation, a first remote directory access write operation to the cluster partner.

As noted above, Craddock does not teach ***a method for initiating a peer-to-peer communication session by performing, in response to a successful first RDMA read operation, a first RDMA write operation to the cluster partner.*** As such, Applicant respectfully urges that Craddock and Plummer either taken singly or in any combination are legally insufficient to render the presently claimed invention obvious under 35 U.S.C. § 103 because of the absence in each of the cited patents of Applicant's claimed ***performing, in response to a successful first RDMA read operation, a first RDMA write operation to the cluster partner.*** Therefore, claims 13-14 are believed to be in condition for allowance.

At paragraphs 13 to 15 of the Office Action, claims 17-19 were rejected under 35 U.S.C. § 103 as being unpatentable over Craddock in view of Plummer. Applicant respectfully notes that claims 17-19 are dependent claims that depend from independent claims which are believed to be in condition for allowance. Accordingly, claims 17-19 are believed to be in condition for allowance.

At paragraph 24 of the Office Action, the Examiner rejected claims 10-12 and 20-23 under 35 U.S.C. § 103(a) as being unpatentable over Craddock in view of Sutherland et al., U.S. Publication No. 2002/0114341 (hereinafter "Sutherland").

Applicant's claimed novel invention, as set forth in representative claim 10, comprises in part:

10. A storage operating system, executing on a storage system, the storage operating system comprising:

a cluster connection manager adapted to initiate a peer to peer communication session with a cluster partner upon initialization of the storage operating system.

As discussed above, Craddock does not teach ***a cluster connection manager adapted to initiate a peer to peer communication session with a cluster partner upon initialization of the storage operating system.*** Sutherland discloses a network storage system comprising a storage coordinator that manages distributed storage resources. Sutherland teaches that the storage coordinator may manage the storage resources by assigning nodes to various groups and allocating the storage resources on each of the nodes in a given group to maintaining dynamically replicated versions of the group files [Abstract]. Sutherland does not teach ***a cluster connection manager adapted to initiate a peer to peer communication session with a cluster partner upon initialization of the storage operating system.*** As such, Applicant respectfully urges that Craddock and Sutherland either taken singly or in any combination are legally insufficient to render the presently claimed invention obvious under 35 U.S.C. § 103(a) because of the absence in each of the cited patents of Applicant's claimed use of ***a cluster connection manager adapted to initiate a peer to peer communication session with a cluster partner upon initialization of the storage operating system.*** Therefore, claims 10-12 are believed to be in condition for allowance.

Further, Applicant's claimed novel invention, as set forth in representative claim 20, comprises in part:

20. A system configured to establish reliable peer-to-peer communication among storage systems of a clustered environment, the system comprising:

a peer process executing on each storage system partner; and

a cluster connection manager executing on each storage system partner, the cluster connection manager establishing a reliable peer-to-peer connection between each peer process by connecting to a predetermined port number using a predetermined network address.

As noted above Craddock does not teach *a cluster connection manager executing on each storage system partner, the cluster connection manager establishing a reliable peer-to-peer connection between each peer process by connecting to a predetermined port number using a predetermined network address.* As such, Applicant respectfully urges that Craddock and Sutherland either taken singly or in any combination are legally insufficient to render the presently claimed invention obvious under 35 U.S.C. § 103(a) because of the absence in each of the cited patents of Applicant's claimed use of *a cluster connection manager executing on each storage system partner, the cluster connection manager establishing a reliable peer-to-peer connection between each peer process by connecting to a predetermined port number using a predetermined network address.* Therefore, claims 20-23 are believed to be in condition for allowance.

Conclusion

All independent claims are believed to be in condition for allowance.

All dependent claims are believed to be dependent from allowable independent claims, and therefore in condition for allowance.

Favorable action is respectfully solicited.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

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